

St. Clair River
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REMEDIAL ACTION PLAN

St. Clair River Area of Concern

**Canadian Remedial Action Plan
Implementation Committee**

Work Plan 2007 - 2010



St. Clair River Area of Concern Canadian Remedial Action Plan Implementation Committee Work Plan 2007

Foreword

In October of 2005 the St. Clair River Canadian RAP Implementation Committee (CRIC) was formed. The mandate of the CRIC is to restore beneficial use impairments (BUIs) identified in the Stage 1 Remedial Action Plan for the Canadian portion of the St. Clair River AOC through the achievement of delisting criteria. This committee recognizes the effort undertaken to date within the AOC towards improving and restoring these BUIs. To achieve this mandate, the CRIC is responsible for the overall coordination of implementation actions that address the outstanding beneficial use impairments applicable to the Canadian portion of the Area of Concern.

One of the first actions undertaken by this committee was to update the 1995 Stage 2 Recommended Plan. In order to undertake this task the committee formed four sub committees including, i) Point Source, ii) Sediments, iii) Habitat/Non-point Source and iv) Monitoring and Research. The entire committee completed a section on Public Outreach and Education. Each sub committee was responsible for reviewing priority actions from the 1995 Stage 2 Recommended Plan to identify achievements and identify outstanding priority actions. .

The following individuals are or have been members of the Canadian RAP Implementation Committee and have been instrumental in the creation of this document.

Ted Briggs (MOE)
Rich Drouin (MNR)
John Jackson (BPAC)
Ron Ludolph (RLSN)
Scott Munro (SLEA)
Cale Selby (RLSN)
Norm Smith (DFO)
Phil Vallance (BPAC)
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Donald Craig (SCRCA)
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Tom Kissner (Municipality of Chatham Kent)
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Introduction

The St. Clair River was identified in 1985 by the International Joint Commission (IJC) as one of 42 Areas of Concern (AOC) in the Great Lakes Basin because it failed to meet the general or specific objectives of the Great Lakes Water Quality Agreement (GLWQA) and changes in the chemical, physical or biological integrity of the system resulting in the impairment of beneficial uses. These impairments occurred because of elevated contaminant concentrations in the water, biota and sediment of the St. Clair River and the physical loss and degradation of aquatic shoreline and coastal wetland habitat. A letter of intent was signed in December, 1985 by the Premier of Ontario and the Governor of Michigan, establishing a joint Remedial Action Plan (RAP) process and providing for Ontario to take the lead role for the St. Clair River AOC. This agreement facilitated the development of a Binational Remedial Action Plan (RAP) Committee/Team in 1987, comprised of federal, state and provincial representatives.

The following Canadian work plan is a continuation of, and revision to, the binational work plan of the 1995 St. Clair River Stage 2 – Recommended Plan. These work plans propose actions that will lead to the rehabilitation of Beneficial Use Impairments (BUIs) of the St. Clair River that presently have a status of “Impaired”, or “Require Further Assessment.” The Binational work plan prepared for the 1995 St. Clair River Stage 2 – Recommended Plan listed 45 Actions/Issues to address BUI delisting criteria. A particular BUI may be re-designated to a status of “Not Impaired” when the delisting criteria are achieved. When all BUIs have been re-designated as “Not Impaired”, a recommendation and submission to the IJC can be made to de-list the St. Clair River as an AOC. The Actions/Issues of the 1995 binational work plan were grouped under the following headings: Point Source; Non-Point Source (NPS); Sediment; Habitat; Public Education and Outreach; Monitoring and Research; and RAP Implementation. For each Action a responsible agency and anticipated completion date were specified. Completion dates in the work plan ranged from 1995 to 2005. In recognition that the RAP process was in the Stage

2 implementation stage, the original RAP Team and Binational Public Advisory Committee (BPAC) established four “Task Teams” to undertake the assessment and evaluation of remedial options. The Task Teams formed were: Point Source; NPS; Sediment and Habitat; and, Common Issues e.g. education.

It was anticipated that certain actions of the 1995 binational work plan would require more time to complete than the 1995 to 2005 time frame. Consequently, continuation of certain actions was necessary and representatives of the Canadian RAP Implementation Committee (CRIC) established in 2005 have prepared the following Canadian work plan. Representatives include federal and provincial governments, industry, municipalities and First Nations. Two representatives from the BPAC also sit on the CRIC. The CRIC chose to establish four sub-committees to complete the work plan: Point Source, Habitat and NPS, Monitoring and Research, and Sediment. The mandate of these sub-committees was to assess the status and progress of the priority actions in the 1995 binational work plan and to review original delisting criteria (targets). A variety of sources were used to establish the progress and status of these actions and targets. Through the collection of additional data, some actions were deemed to be completed, while other actions were found to be on-going or in need of additional monitoring, research and implementation actions. The present work plan recommendations and actions were developed by the four sub-committees and combined to create a single CRIC work plan.

While numerous agencies and organizations are listed as being responsible in providing information through monitoring and research activities, it is important to understand that these activities are dependent upon available funding, sufficient field staff, available time for field studies and coordination among respective agencies and branches within agencies.

SECTION 1 – POINT SOURCE WORK PLAN

Introduction

The 1995 Binational work plan listed some 16 Issues related to Point Sources of pollution that included direct discharges from: industry; municipal Water Pollution Control Plants (WPCPs); municipal Combined Sewer Overflows (CSOs), and discharge from the Cole Drain. The 1995 Binational work plan grouped these Point Sources by Issue. As a first step, it was decided by the Point Source Sub-committee to re-list Point Sources separately, rather than grouping them by Issue. A variety of sources were used to establish the progress and status of these Actions. Through the collection and discussion of this information, the Point Source Subcommittee identified many Actions as completed. However, other Actions were found to be on-going and/or requiring additional focus and steps in order to conclude all actions.

#1.1 Recommendation

Track monitoring of decommissioned and decommissioning of industrial facilities and landfills in the St. Clair River (e.g. Dow Canada, Chinook) and continue to examine and mitigate any existing or potential future environmental impacts due to residual contaminant sources on St Clair River beneficial uses.

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Restrictions on fish and wildlife consumption • Fish tumours and other deformities • Degradation of benthos • Restrictions on dredging activities • Loss of fish and wildlife habitat 	<p><u>Rationale</u></p> <p>Dow Chemical Canada is closing the Sarnia plant in 2008. Remedial actions related to Dow may be required. There are ongoing groundwater capture and treatment systems in place. Monitoring and maintenance of these systems will be necessary. There will be a need to continue to monitor and ensure compliance of sewer discharge quality and quantity.</p>	<p><u>Current Status</u></p> <p>A Canada-Ontario Agreement (COA) Contaminated Sediment Assessment Decision Making Framework for the Great Lakes Basin AOCs (Environment Canada\Ontario Ministry of Environment (EC/MOE)) has been developed and will soon be available for use at all contaminated sediment sites. For additional information on Dow remediation actions, see Appendix 1- Stage 2 Point Source Work Plan Assessment and Status.</p>
<p><u>Actions</u></p> <ul style="list-style-type: none"> • Maintain and review point source regulatory monitoring (Municipal Industrial Strategy for Abatement (MISA), Certificate of Approval (C of A) to ensure timely reporting and information dissemination on environmental concerns. • Maintain and review corridor/river monitoring programs and ensure timely delivery of results for synthesis and BUI assessments. 		<p><u>Responsible Organizations</u></p> <ul style="list-style-type: none"> • Ministry of the Environment • Environment Canada • Dow Chemical <p><u>Anticipated Costs and Timelines</u></p> <p>Work is ongoing. Costs unknown, but depend on future work associated with risk management required and regulatory monitoring to meet Certificate of Approval.</p>

#1.2 Recommendation

Ensure that Water Pollution Control Plants (WPCPs) continue to meet current regulations and do not negatively affect beneficial uses.

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Bird or animal deformities or reproductive problems • Beach closings • Degradation of aesthetics 	<p><u>Rationale</u></p> <p>Water Pollution Control Plants are an ongoing source of loadings to AOCs as a result of their basic function. Water Pollution Control Plants in the St. Clair River currently meet discharge limits and are not currently targeted for action related to the identified BUIs. Should WPCPs be determined to be contributing to BUIs, then future improved treatment may be considered (i.e., improved disinfection, plant optimization).</p>	<p><u>Current Status</u></p> <p>WPCPs are currently meeting C of A requirements which include consideration of BUIs.</p> <p>See Appendix 1 for details.</p>
<p><u>Actions</u></p> <ul style="list-style-type: none"> • Cities of Sarnia and Wallaceburg, villages of Point Edward, Corunna and Courtright, towns of Sombra and Port Lambton must continue to operate their WPCPs and lagoons in order to meet discharge criteria as identified in their C of A. • Develop a Master Plan for sewage treatment for the City of Sarnia which includes, plan optimization, elimination of by-passes and CSOs. • Assess the need for disinfection at Port Lambton and Sombra lagoons if Beach Closings for bacteria are still occurring once all other sources are remediated. • Determine the wastewater treatment practices on Walpole Island and assess if there are any impacts St. Clair River beneficial uses and identify work plan additions to support delisting. • Maintain and review WPCP regulatory monitoring (C of A) to ensure that recommendation is achieved. • Maintain and review corridor/river monitoring programs and ensure timely delivery of results for use in BUI assessments. • 		<p><u>Responsible Organizations</u></p> <ul style="list-style-type: none"> • Ministry of the Environment • Municipalities • Walpole Island First Nation (WIFN) • Environment Canada • Indian and Northern Affairs (INAC) <p><u>Anticipated Costs and Timelines</u></p> <p>Work is ongoing for regulatory monitoring. Master Plan is estimated to cost \$300,000 with a completion over the next three years. The Courtright and Corunna WPCP cost is expected to be \$30 M with an unknown timeline.</p>

#1.3 Recommendation

Complete programs to eliminate combined sewer overflows (CSOs).

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Bird or animal deformities or reproductive problems • Beach closings • Degradation of aesthetics 	<p><u>Rationale</u></p> <p>CSOs have been a problem in the AOC for many years and are thought to be directly related to Beach Closings. Although it will take time to address the issue completely, ongoing projects will help to reduce or eliminate these discharges to the St. Clair River.</p>	<p><u>Current Status</u></p> <p>The City of Sarnia is currently working to eliminate CSOs within the city (i.e. Exmouth Street Sanitary Disconnection and Devine St. holding tanks). The St. Clair River CRIC is working closely with the City and supports this ongoing work.</p> <p>No CSOs exist in Corunna, Courtright, Mooretown, Sombra and Port Lambton. It is unknown if Point Edward is experiencing mixing of sanitary sewage with stormwater discharging to the river. Wallaceburg has completed 95 percent of projects dealing with CSOs and programs are in place for remaining actions.</p> <p><u>Responsible Organizations</u></p> <ul style="list-style-type: none"> • Ministry of the Environment • Municipalities • Walpole Island First Nation (WIFN) • Aamjiwnaang First Nation (AFN) • Environment Canada (EC) • Indian and Northern Affairs (INAC) <p><u>Anticipated Costs and Timelines</u></p> <p>With respect to the City of Sarnia municipal wastewater control, current estimates for infrastructure upgrades are estimated to be in the order of \$100 M for combined CSOs. The anticipated timeline for completion is 2027.</p>
<p><u>Actions</u></p> <ul style="list-style-type: none"> • Eliminate Exmouth Street CSO in the City of Sarnia. • Eliminate Christina Street CSO in the City of Sarnia. • Completely separate cross connections within the City of Sarnia Sanitary Drainage Area 1. • Complete City of Sarnia East Street sanitary interceptor sewer to divert sewage from Drainage Areas 2 & 4 to WPCP. • Determine the effectiveness of the Devine Street CSO holding tank in the City of Sarnia at full capacity. • Determine whether there are CSO discharges from Walpole Island First Nation impacting on the river beneficial uses and identify work plan additions to support delisting. • Determine whether there are CSO discharges from Aamjiwnaang First Nation impacting on the river beneficial uses and identify work plan additions to support delisting. • Determine whether there are sanitary/stormwater sewer cross connections in Point Edward and identify work plan additions to support delisting. • Maintain and review corridor/river monitoring programs and ensure timely delivery of results for synthesis and BUI assessments. 		

#1.4 Recommendation

Continue to work closely with industries to improve spill prevention to the St. Clair River.

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Restriction on drinking water consumption or taste and odour problems • Degradation of aesthetics • Added cost to agriculture and industry • Degradation of fish and wildlife populations 	<p><u>Rationale</u></p> <p>Current delisting criteria for drinking water require “no spills over a two year period resulting in a mandated shutdown of a drinking water intake.”</p>	<p><u>Current Status</u></p> <p>The Industrial Pollution Action Team (IPAT) examined causes of industrial spills to the St. Clair River and made recommendations on spill prevention measures for industries and others. Implementations of IPAT recommendations are ongoing.</p> <p>Ont. Regulation 224/07 "Spill Prevention and Contingency Plans" was put in place and defines the mandates for spill prevention and contingency plans and must be in place by September 2008.</p>
<p><u>Actions</u></p> <ul style="list-style-type: none"> • Assess extent to which regulatory changes made in 2005 – 2007 have addressed IPAT recommendations and identify which remaining recommendations will be implemented. • Continue to work with industry to develop closed loop cooling water systems, cooling water towers or monitor and divert systems. • Continue MISA and C of A monitoring and improve MOE data reporting to AOC lead agencies for use in assessing BUI status. 		<p><u>Responsible Organizations</u></p> <ul style="list-style-type: none"> • MOE • Industries • Sarnia Lambton Environmental Association (SLEA) <p><u>Anticipated Costs and Timelines</u></p> <p>Costs are unknown, but would be incurred through the implementation of IPAT recommendation, implementation (industry) and ongoing regulatory monitoring programs (C of A and MISA). Timelines are unknown and depend on IPAT recommendations.</p>

ST. CLAIR RIVER AOC - POINT SOURCE WORK PLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead	Comments
Track decommissioned and decommissioning of industrial facilities and landfills in the St. Clair River (e.g. Dow Canada, Chinook) and continue to examine and mitigate any existing or potential future environmental impacts due to residual contaminant sources on St Clair River beneficial uses.	Maintain and review point source regulatory monitoring (Municipal Industrial Strategy for Abatement (MISA), Certificate of Approval (C of A) to ensure timely reporting and information dissemination on environmental concerns.	*	*	*	*	*	MOE	Dow will be undertaking the ongoing monitoring. Chinook has also already shut down.
	Maintain and review corridor/river monitoring programs and ensure timely delivery of results for synthesis and BUI assessments.	*	*	*	*	*	MOE/EC	Identify ongoing agency monitoring to determine if programs are adequate for BUI assessment.
Ensure that Water Pollution Control Plants continue to meet current regulations and do not negatively affect beneficial uses.	Cities of Sarnia and Wallaceburg, villages of Point Edward, Corunna and Courtright, towns of Sombra and Port Lambton must continue to operate their WPCPs and lagoons in order to meet discharge criteria as identified in their C of A.	*	*	*	*	*	MOE	
	Assess the need for disinfection at Port Lambton and Sombra lagoons if Beach Closings for bacteria are still occurring once all other sources are remediated.					*	MOE	
	Develop a Master Plan for sewage treatment for the City of Sarnia which includes plant optimization, elimination of bypasses and CSOs.			*			City of Sarnia	CRIC to identify key milestones not already identified in work plan once the master plan is completed.
	Determine wastewater treatment practices on Walpole Island to determine if there are any impacts St. Clair River beneficial uses and identify work plan additions to support delisting.			*			EC	If impacts are identified, develop and implement remedial strategy and identify within work plan.
	Maintain and review WPCP regulatory monitoring (C of A) to ensure that recommendation is achieved.	*	*	*	*	*	MOE	Monitoring used to assess BUIs to determine benefits of work.
	Maintain and review corridor/river monitoring programs and ensure timely delivery of results for use in BUI assessments.	*	*	*	*	*	MOE/EC	Monitoring used to assess BUIs to determine benefits of work.
Complete programs to eliminate combined sewer overflows (CSOs).	Eliminate Exmouth Street CSOs in the City of Sarnia.	*	*				City of Sarnia	This work is currently underway as part of a three year project.
	Eliminate Christina Street CSOs in the City of Sarnia.			*			City of Sarnia	
	Completely separate cross connections within the City of Sarnia Sanitary Drainage Area 1.					*	City of Sarnia	

ST. CLAIR RIVER AOC - POINT SOURCE WORK PLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead	Comments
	Complete City of Sarnia East Street sanitary interceptor sewer to divert sewage from Drainage Areas 2 & 4 to WPCP.				*		City of Sarnia	The City has already received \$3,000,000 towards this project and has applications in for further federal funding.
	Determine the effectiveness of the Devine Street CSO holding tank in the City of Sarnia at full capacity.			*			City of Sarnia	
	Determine whether there are CSO discharges from Walpole Island First Nation impacting on the river beneficial uses and identify work plan additions to support delisting.		*				EC/ MOE	If impacts are identified then develop and implement remedial strategy and identify within work plan.
	Determine whether there are CSO discharges from Aamjiwnaang First Nation impacting on the river beneficial uses and identify work plan additions to support delisting.		*				EC/ MOE	If impacts are identified, develop and implement remedial strategy and identify within work plan.
	Determine whether there are sanitary/stormwater sewer cross connections in Point Edward and assess work plan additions to support delisting.			*			MOE/ EC	If impacts are identified then develop and implement remedial strategy and identify within work plan.
	Maintain and review corridor/river monitoring programs and ensure timely delivery of results for synthesis and BUI assessments.	*	*	*	*	*	MOE/ EC	
Continue to work closely with industries to improve spill prevention to the St. Clair River.	Assess extent to which regulatory changes made in 2005 – 2007 have addressed IPAT recommendations and identify which remaining recommendations will be implemented e.g., <ul style="list-style-type: none"> ▪ Track the progress of industries meeting the requirements as stated under MOE Bill 133; ▪ Continue to work with industry to develop closed loop cooling water systems, cooling water towers or monitor and divert systems. 					*	MOE	
	Continue Municipal Industrial Strategy for Abatement (MISA) and Certificate of Approval (C of A) monitoring and improve MOE data reporting to AOC lead agencies for use in assessing BUI status.	*	*	*	*	*	MOE	

SECTION 2 – SEDIMENT WORK PLAN

Introduction

Since the 1997 Update Report, much of the bottom sediment and benthic quality work has focused on sediment characterization of three known contaminated zones offshore from the Sarnia Industrial Complex adjacent to the St. Clair River (Zones 1, 2 and 3). The area for highest priority remediation “Zone 1” was directly adjacent to Dow Chemical Canada. Dow undertook a three-phase sediment cleanup project in the portion of “Zone 1” adjacent to their river-front property during the period from June 2001 through to 2004. Phase 1 was completed in 2002, Phase 2 in 2003, and Phase 3 was completed in 2004, resulting in the removal of 13,370 m³ of contaminated bottom sediment.

#2.1 Recommendation

Undertake an assessment of contaminated sediments in the St. Clair River and determine actions.

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Restrictions on fish and wildlife consumption • Degradation of fish and wildlife populations • Fish tumours and other deformities • Bird or animal deformities and reproductive problems • Degradation of benthos • Restrictions on dredging activities 	<p><u>Rationale</u></p> <p>While data has been collected for zones 2 and 3, sediment management decisions are required to determine remedial measures for these remaining priority zones.</p>	<p><u>Current Status</u></p> <p>The proposed COA Contaminated Sediment Assessment Decision-Making Framework was developed by the OMOE and EC and provides a consistent and harmonized approach for assessing contaminated sediments. The Decision-Making Framework is a science-based approach for assessing contaminated sediment on a site-by-site basis by incorporating information from four lines of evidence: sediment chemistry, laboratory sediment toxicity, benthic community structure, and biomagnification potential.</p> <p>Sediment samples and benthic community data have been collected from the entire St. Clair River beginning in 1958 and most recently in 2006 to further delineate the contaminated sediment area for management. For additional background information, refer to Appendix 2.</p>
<p><u>Actions</u></p> <ol style="list-style-type: none"> 1. Establish a Technical Steering Committee. 2. Hire a Project Manager to facilitate the decision making process for contaminated sediments in zones 2 and 3. (if required) 3. Identify and address sediment chemistry, biological and other data gaps for zones 2 & 3. 4. Use the COA “Assessment Framework” on St. Clair River sediment to determine the need for contaminant sediment management strategies. 5. Develop sediment management options and select preferred option for zones 2 & 3. <ol style="list-style-type: none"> a. Conduct "Public, First Nation and Stakeholder Consultation" to seek consensus. <p>If sediment removal is necessary, the following steps are required for implementation:</p> <ol style="list-style-type: none"> 6. <ol style="list-style-type: none"> a) Develop engineering design b) Secure funding c) Undertake an Environmental Assessment d) Implement sediment remediation strategy e) Environmental Monitoring f) Public and agency communications 7) Evaluate the effectiveness of remediation on beneficial uses. 		<p><u>Responsible Organizations</u></p> <ul style="list-style-type: none"> • MOE • EC, • Industries • SLEA <p><u>Anticipated Costs and Timelines</u></p> <p>Sediment management options will be approved by 2010.</p>

ST. CLAIR RIVER AOC - SEDIMENT WORK PLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead
Undertake an assessment of contaminated sediments in the St. Clair River and determine actions.	Establish a Technical Steering Committee.	*					EC, OMOE
	Hire a Project Manager to facilitate the decision making process for contaminated sediments in zones 2 & 3. Position depending on 2007 funding and may include non-sediment related tasks.	\$50 K	\$100K	\$100K	\$100K		EC, OMOE
	Identify and address sediment chemistry, biological and other data gaps for zones 2 & 3.	*	*				EC, OMOE
	Use the COA "Assessment Framework" on St. Clair River sediment to determine the need for contaminant sediment management strategies.		*	*			EC, OMOE
	Develop sediment management options and select preferred option for zones 2 & 3. a) Conduct "Public, First Nation and Stakeholder Consultation" to seek consensus.			*	*		EC, OMOE
	If sediment removal is necessary, the following steps are required (Following points are dependent upon above results and expected to commence after 2010):					*	EC, OMOE
	a) Develop engineering designs					*	EC, OMOE
	b) Secure funding					*	EC, OMOE
	c) Undertake an Environmental Assessment (EA)					*	EC, OMOE
	d) Implement the sediment remediation strategy					*	EC, OMOE
	e) Environmental Monitoring (i.e., as per C of A)					*	EC, OMOE
	Evaluate the effectiveness of remediation on beneficial uses.					*	EC, OMOE

SECTION 3 - HABITAT & NON-POINT SOURCE (NPS) WORK PLAN ■■■■■■■■■■

Introduction

Physical loss of fish and wildlife habitat was listed as a BUI for the St. Clair River AOC in the 1991 Stage 1 RAP - Environmental Conditions and Problem Definition. The impairment status was based on coastal wetland loss and fragmentation, loss of wetland function, and extensive bulkheading and infilling of the St. Clair River shoreline. The 1995 Stage 2 RAP - Recommended Plan also recognized environmental problems associated with NPS pollution in the watershed due mainly to urban and rural storm runoff, waste sites without leachate and runoff collection, malfunctioning septic systems and generation and disposal of household hazardous waste.

In order to guide rehabilitation efforts, the 1995 St. Clair River RAP Stage 2 – Recommended Plan provided a summary of significant habitat and NPS actions and delisting criteria for the “loss of fish and wildlife habitat.” Delisting criteria consist of wetland protection, a long-term habitat management plan and rehabilitation and enhancement projects focused on wetland creation in the Chenal Ecarte (155 ha), aquatic habitat creation around Stag Island (80 ha) and in the W. Darcy McKeough Floodway (445 ha).

In 2005, the CRIC established a Habitat and NPS Subcommittee (the Committee) to assess the status and progress on the 1995 Stage 2 delisting criteria and priority habitat and NPS actions. Proceedings from a 2006 Habitat and NPS Workshop and subsequent Committee meetings revealed that, while many milestones have been achieved, the 1995 delisting criteria for “loss of fish and wildlife habitat” were not achieved due to unforeseen constraints and certain priority habitat and NPS actions have not been addressed. The present Work Plan was developed by the Habitat and NPS Subcommittee to guide remedial actions to rehabilitate fish and wildlife habitat with an emphasis on “aquatic habitat and water quality” within the AOC boundary.

The Committee identified a need to refocus efforts on the original causes of habitat impairment and non-point source pollution using a systematic approach. In order to guide habitat and NPS project site selection, the following the hierarchical “*Updated Habitat and NPS Rehabilitation Priority Sites*” were developed by the Committee:

- 1) Coastal wetlands with direct hydrological connection to the St. Clair River & delta;
- 2) Shoreline softening of the St. Clair River and riverine habitat rehabilitation;
- 3) Other wetlands in Area 1A providing aquatic habitat;
- 4) Riparian buffers along the St. Clair River;
- 5) Riparian buffers in the tributaries of Area 1A; and,
- 6) Other habitat rehabilitation work which address improved water quality conditions and fish and aquatic wildlife habitat in Areas 1A and 1B.

An explanation and maps of the St. Clair River AOC boundaries are provided in *Appendix 1*.

#3.1 Recommendation

In addition to the delisting criterion pertaining to Chenal Ecarte wetland creation, broaden the scope of wetland habitat projects to include creation, rehabilitation, acquisition and maintenance within the Walpole Island First Nation delta and headwaters of AOC creeks (as per the Updated Habitat and NPS Rehabilitation Priority Sites).

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Loss of fish and wildlife habitat; • Degradation of fish and wildlife population • Degradation of benthos 	<p><u>Rationale</u></p> <p>One of the 1995 Stage 2 rehabilitation and enhancement delisting criteria for habitat included wetland creation (155ha) at 10 sites adjacent to the Chenal Ecarte. This criterion was not achieved, and by including rehabilitation, acquisition and maintenance, and targeting the entire coastal wetland complex and headwaters of tributaries within the AOC, there will be greater opportunity to increase wetland quantity as well as improve wetland quality. Currently, a review of the existing delisting criterion may result in a change to the original target. This would require wetland evaluations to be conducted to identify priority sites.</p> <p>Participants at the 2006 St. Clair River AOC Habitat Workshop and members of the Habitat and NPS Subcommittee also expressed concern over the expansion of non-native <i>Phragmites</i> into existing and previously rehabilitated wetlands. Thus, efforts to maintain and rehabilitate the quality of existing wetlands should be pursued.</p>	<p><u>Current Status</u></p> <p>Approximately 106 ha of wetlands have been created, acquired and rehabilitated adjacent to the Chenal Ecarte. The invasiveness of <i>Phragmites</i> within these wetlands is degrading the quality of habitat and out-competing native vegetation, leading to dense monotypic stands.</p>
<p><u>Actions</u></p> <ul style="list-style-type: none"> • Make use of the 2006 GIS database created by Aylmer District OMNR to locate potential wetland habitat project sites. • Create an inventory of prioritized wetland project sites by following the “2007 Updated Habitat and NPS Rehabilitation Priority Sites” presented in the Introduction. • Establish wetland goals and objectives for the AOC and develop numerical (or qualitative) wetland delisting criteria (targets). Track progress toward wetland targets. • Identify and engage landowners, seek funding and implement coastal wetland habitat projects within the AOC to maintain and improve the integrity and hydrologic connectivity of coastal wetlands for fish spawning, nursery and feeding areas and aquatic wildlife needs. • Assess the quality of coastal wetland habitat in the Chenal Ecarte and WIFN delta by collecting data on water quality, aquatic macroinvertebrates, amphibians (if possible), marsh birds, and submerged aquatic vegetation (for more detail see Section 4- Research and Monitoring). <ul style="list-style-type: none"> ○ Examine options, risks and benefits of improving fish access to impounded wetlands (i.e., possible impacts on species at risk (SAR, waterfowl production etc.). ○ Work with Walpole Island Heritage Centre regarding aquatic habitat needs to meet fish and wildlife goals and develop a list of project sites in the First Nation delta. ○ Examine ways to control and prevent <i>Phragmites</i> invasion; monitor high-quality and susceptible wetlands, select demonstration areas for control, and plan steps for controlling established <i>Phragmites</i>. Share experiences and transfer knowledge. ○ Prepare wetland quality report with management recommendations once assessments have been completed. 	<p><u>Responsible Organizations</u></p> <p>WIFN, SCRCA, Lambton County, Municipality of Chatham-Kent, OMNR, EC, DFO</p> <p><u>Anticipated Costs and Timelines</u></p> <p>See table at end of section.</p>	

#3.2 Recommendation

Integrate shoreline erosion control approaches and shoreline development (or redevelopment) projects with environmentally friendly habitat approaches (e.g. shoreline softening, buffer strips and spawning channels) that take nearshore aquatic habitats and hydraulic impacts into account.

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Loss of fish and wildlife habitat • Degradation of fish and wildlife populations • Degradation of benthos 	<p><u>Rationale</u></p> <p>Shoreline hardening was listed as one of the original causes of impairment of the beneficial use “Fish and Wildlife Habitat” (RAP Stage 1, 1991). Participants of the 2006 Habitat Workshop identified the St. Clair River nearshore/shoreline as a major priority for the AOC.</p>	<p><u>Current status</u></p> <p>Much of the St. Clair River shoreline has been replaced with steel sheet piling and other structures which have resulted in the loss of shoreline and littoral habitat. Projects have been initiated to address shoreline hardening such as the Lanxess shoreline cleanup, erosion control and fish and wildlife habitat enhancement project in 2006, and the MacDonald Park shoreline softening and rehabilitation project.</p> <p>A St. Clair River Shoreline Rehabilitation Assessment and Design of Restorative Work was recently completed by the St. Clair Region Conservation Authority (SCRCA). A more detailed survey and report is expected to be completed in 2007. Class Environmental Assessments are ongoing at Guthrie Park and the CN Lands on Sarnia Bay and shoreline rehabilitation is expected in 2007.</p>
<p><u>Actions</u></p> <ul style="list-style-type: none"> • Develop an Integrated Shoreline Management Plan for the St. Clair River • Use GIS to inventory/map existing shoreline hardening structures on public and private lands and assess condition, habitat features, sediment profile and contaminants, plant, fish and wildlife communities at each site. • Establish quantitative and/or qualitative shoreline rehabilitation targets including cost benefits and environmental analysis. Candidate sites include but are not limited to: CN Lands on Sarnia Bay, Guthrie Park; Courtright Waterfront Park; Willow Park; Cathcart Park, and Marshy Creek Park, Stag Island and Walpole Island Delta. Develop engineering plans for candidate sites on public lands which incorporate shoreline softening techniques that replace degraded structures. • At sites where softening has occurred, rehabilitate littoral habitat by installing reef structures, submerged rock clusters/shoals, cobble or fish mix and coves to improve the quality of littoral fish habitat. Establish native grasses, shrub and tree plantings at candidate sites behind the shoreline structure. • Assess the extent of shoreline projects completed elsewhere within the AOC (e.g., SCRCA projects, Chatham-Kent work at MacDonald Park) for reporting purposes. • Identifying potential opportunities for increasing river flow capacity as credits for in fill projects. 		<p><u>Responsible Organizations</u></p> <p>EC, DFO, SCRCA, MNR, Lambton County and Municipalities, Municipality of Chatham-Kent, industries</p> <p><u>Anticipated Costs and Timelines</u></p> <p>A St. Clair River Shoreline Rehabilitation Assessment and Design was initiated in 2005/2006. In 2007, data assembly will be completed and web access to Geoportal for controlled external access to the information collected will be provided for testing. Initial cost is \$70,000.</p> <p>Class Environmental Assessments are under way at Guthrie Park and in the City of Sarnia – CN lands. The implementation of shoreline softening and aquatic habitat rehabilitation is at these locations is expected to occur in 2007 with completion in winter of 2009.</p> <p>The proposed shoreline softening and rehabilitation project is expected to cost approximately \$3,000/metre.</p>

#3.3 Recommendation

Establish and implement a riparian habitat and buffering program for the St. Clair River AOC (as per the Updated Habitat and NPS Rehabilitation Priority Sites).

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Loss of fish and wildlife habitat • Degradation of fish and wildlife populations; • Beach closings (bacteria from urban and rural runoff, domestic sanitary sources) 	<p><u>Rationale</u></p> <p>Riparian habitat or vegetation refers to the plant communities established immediately adjacent to stream, river, lake and/or wetland systems. Riparian buffering addresses GLWQA and COA goals for both NPS pollution control and habitat rehabilitation. Headwaters of creeks, drains, and the confluence of creeks and the St. Clair River provide important aquatic habitat. These habitats should be maintained and where possible rehabilitated. As the majority of opportunities for habitat rehabilitation and riparian buffering are on private lands, a comprehensive and systematic stewardship program with financial incentives is an essential component for the implementation of riparian buffering and aquatic habitat needs</p>	<p><u>Current Status</u></p> <p>The 2006 St. Clair River Area of Concern Geographic Information Systems (GIS) analysis shows that the percentage of tributaries buffered by greater than five (5) meters of natural vegetation in Area 1A of the AOC is approximately 12 percent. This represents approximately half of the tributary buffering in the surrounding watersheds (Area 1B = 28.7%; Area 2 = 22.1%). Riparian buffering is most needed in Area 1A.</p>
<p><u>Actions</u></p> <ul style="list-style-type: none"> • Systematically identify public, private and industrial land use and ownership adjacent to tributaries flowing directly into the St. Clair River and prepare a land-use inventory including zoning status (as per the <i>Updated Habitat and NPS Rehabilitation Priority Sites</i>). • Undertake a proactive landowner contact program starting in Area 1A to increase the number of landowners involved in tributary buffering within the AOC boundaries. • Identify riparian buffer priorities and targets for each tributary based on land-owner cooperation and habitat value. • Rehabilitate a minimum of 20 km/year of riparian habitat by establishing vegetative buffer strips, planting appropriate native vegetation, undertaking stream bank stabilization activities, and/or restricting livestock access to riparian areas adjacent to tributaries in Area 1A to a minimum of 3-5 metres. • Track habitat and riparian buffer projects and provide annual reports on the status towards meeting targets. Include information such as: uptake on Environmental Farm Plans; uptake on landowner funding programs; SCRCA and RLSN annual reports. 	<p><u>Responsible Organizations</u> EC, MNR, DFO, OMAFRA, WIHC</p> <p><u>Anticipated Costs and Timelines</u> Total costs are unknown; however, the RLSN has identified four creek/drain systems in Area 1A flowing into the St. Clair River and will be targeting these systems for appropriate vegetative buffering in 2007. The St. Clair River Stewardship Initiative will provide funding to private landowners in these watersheds to cover the costs of planting and establishing the riparian buffers. The approximate cost for habitat rehabilitation: 1200/ha (\$3000/acre). The approximate cost for incentive payment to farmers: based on the average rental rate in St. Clair Township \$320-400/ha/year (\$130.00-\$160.00/acre/year.)</p>	

#3.4 Recommendation

Improve the biological connectivity within the AOC with a focus on Area 1A.

<p>BUIs Potentially Impacted</p> <ul style="list-style-type: none"> Loss of fish and wildlife habitat; Degradation of fish and wildlife populations 	<p>Rationale</p> <p>Habitat creation on lands adjacent to Highway 40 provides one of few opportunities to establish a biological corridor in the St. Clair River AOC. The area available is of sufficient size to provide a minimum corridor width of 50 metres which would provide a link between Walpole Island, one of Canada's most biological diverse habitats, the Bickford Oak Woods Conservation Reserve and the Aamjiwnaang First Nation forest tract. As an additional benefit, this project will mitigate the negative environmental effects associated with surface water runoff from Highway 40 into adjacent ditches and drains.</p>	<p>Current status</p> <p>This project was started in 1997 and receives financial support from Environment Canada-Great Lakes Sustainability Fund. Approximately 30 km of Highway 40 has been planted with 2 rows of shrubs and trees and 48 ha of native prairie grasses along the roadside ditches and agricultural drains. Recently, the Rural Lambton Stewardship Network (RLSN), the Ministry of Natural Resources (MNR) and the Ministry of Transportation (MTO) have created a partnership to complete vegetative buffering adjacent to Hwy 40 right-of-way and naturalize adjacent lands.</p>
<p>Actions</p> <ul style="list-style-type: none"> Link the Walpole Island First Nation habitats with the McKeough Floodway, headwaters of the St. Clair River tributaries, Bickford Oak Woods and Aamjiwnaang First Nation forest tract through: <ul style="list-style-type: none"> Planting riparian buffers consisting of rows of native grasses, tallgrass prairie, savannah and native shrubs adjacent to agricultural drains and roadsides along Highway 40; Incorporating wetland creation wherever conditions are favourable. Examine other linkages proposed in the Lambton County NHS (e.g. Clay Creek to the North Sydenham River) and investigate and develop actions for additional opportunities on Walpole Island First Nation Establish signs on Hwy 40 to educate the public on the benefit of biological corridors through riparian buffering. 	<p>Responsible Organizations</p> <p>SCRCA, MTO, MNR, EC, DFO</p> <p>Anticipated Costs and Timelines</p> <p>See table below for details.</p> <p>Potential Funding Sources:</p> <p>Environment Canada-Great Lakes Sustainability Fund, Great Lakes Renewal Foundation, DU Canada, Imperial Oil, Eco-Action, Industry.</p>	

HIGHWAY 40 – FIVE YEAR WORK PLAN				
LANDS OUTSIDE OF RIGHT-OF-WAY				
Lot/Con	Township	Target Acres	Year	Cost (x 1000)
Lot 5, Con 3	Chatham	5	2009-2010	15
Lot 5, Con 3	Chatham	15	2009-2010	45
Lot 5, Con 4	Chatham	8	2009-2010	24
Lot 5, Con 2	Chatham	22	2009-2010	66
Lot 5, Con 2	Chatham	12.8	2010-2011	38
Lot 5, Con 1	Moore	73	2007	219
Lot 5, Con 1	Moore	4.9	2008-2009	7.9
Lot 5, Con 3	Moore	20.7	2008-2009	62.1
Lot 5, Con 4	Moore	7.9	2008-2009	27.3
Lot 5, Con 5	Moore	15.3	2008-2009	45.9
Lot 5, Con 9	Moore	4.9	2008-2009	14.7
Lot 5, Con 11	Sombra	21.2	2008-2009	63.6
Lot 5, Con 12	Sombra	38.2	2007-2008	114.6
Lot 5, Con 12	Sombra	7.5	2008-2009	22.5
Lot 5, Con 15	Sombra	13.9	2009-2010	41.7
	TOTAL	270.3	TOTAL	807.3
LANDS INSIDE RIGHT-OF-WAY				
East side	Approx. 30 km at 4.6 ac/km	138	2008-2011	414
	TOTAL	408.3		1221.3

#3.5 Recommendation

Address and complete all Rural Non-Point Source Pollution and Urban Non-Point Source Pollution “Priority Actions” and track progress impacting on beneficial uses (as per the Updated Habitat and NPS Rehabilitation Priority Sites).

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Restriction on fish and wildlife consumption • Loss of fish and wildlife habitat • Degradation of fish and wildlife populations; • Beach closings 	<p><u>Rationale</u></p> <p>Chemical fertilizers and pesticides are frequently applied to agricultural, rural and residential lands. These fertilizers and chemicals can cause water quality problems that impact fish and wildlife health. As well, livestock operations run the risk of their animal waste contaminating surface and ground water. Land management practices such as the nature and timing of tillage and nutrient applications can positively or negatively influence NPS runoff. A confounding issue is the impact of tile drainage because field tile drains discharge directly to tributaries and bypass biofiltration actions of buffer strips.</p>	<p><u>Current status</u></p> <p>While substantial effort has been put into addressing non-point source pollution in the St. Clair River AOC (e.g. road salt and pesticide reduction plans, agricultural BMPs etc.) many of the 1995 Stage 2 priority actions have yet to be addressed and/or completed.</p> <p>Past and present programs have been implemented to target contamination from runoff, such as; Ontario Rural Runoff; Clean Up Rural Beaches (CURB) program; Permanent Cover II Program; Environmental Farm Plans, and development of BMP manuals. Numerous programs commenced in the 1980s and provided grants to farmers and rural landowners for projects including:</p> <ul style="list-style-type: none"> • fragile land retirement; • conservation tillage; • manure spreading equipment modification; • manure storage; • milk house wash water treatment; • clean water diversions; • fencing livestock from watercourses; • nutrient management plans; • correction of faulty septic systems; and, • vegetated buffer strips
<p><u>Actions</u></p> <ul style="list-style-type: none"> • Continue to provide funding support, technical advice and outreach materials and assist land owners to access funding as part of ongoing NPS and stewardship programs within the AOC (“<i>Updated Habitat and NPS Rehabilitation Priority Sites</i>”). • Develop appropriate Watershed/Subwatershed Management Plans to identify priority NPS sites in the AOC (“<i>Updated Habitat and NPS Rehabilitation Priority Sites</i>”). Consult with St. Clair Region CA, examine MDEQ Plan and use existing reports (e.g. Wetlands, riparian buffer, land use, land ownership) and as a foundation for a SCR-AOC subwatershed Management plan. • Link (integrate) urban/rural storm water control through subwatershed plans. • Support implementation of rural stormwater projects e.g. oxbow management • Identify problems relating to domestic sanitary sources and ensure proper maintenance and repair. <ul style="list-style-type: none"> ▪ Investigate private septic systems within smaller communities and other homes along the St. Clair River including the delta within the AOC to ensure that they are not causing negative effects on water quality of the St. Clair River. ▪ Support the implementation to mitigate septic system related problems within smaller communities and other homes along the river within the AOC e.g. Froomfield and Wilkesport. ▪ Mandate ongoing maintenance of private sewage disposal systems. • Obtain a GIS tile drain layer and identify tile-drain outlet locations. Investigate options to improve water quality at selected pilot sites. • Track NPS projects and provide annual reports on the status to key stakeholders. 		<p><u>Responsible Organizations</u></p> <p>MOE, OMAFRA, EC, DFO, Municipalities, Developers, Canadian Coast Guard (CCG), SCRCA, MNR, Agriculture Canada</p> <p><u>Anticipated Costs and Timelines</u></p> <p>Unknown</p>

#3.6 Recommendation

Promote the protection, preservation and rehabilitation of the natural heritage features of the St. Clair River AOC by encouraging Lambton County and municipalities, and the Municipality of Chatham-Kent to incorporate wording in their Official Plans such that the St. Clair River Area of Concern is recognized as a priority area in need of water quality protection and fish/wildlife habitat conservation and protection.

<p><u>BUIs Potentially Impacted</u></p> <ul style="list-style-type: none"> • Loss of fish and wildlife habitat • Degradation of fish and wildlife populations 	<p><u>Rationale</u></p> <p>Local governments have a very important role to play in wetland and aquatic habitat protection because they are responsible for land use decisions that can negatively affect environmental conditions and natural features in the AOC, and can take a proactive approach that extends beyond individual sites to include the entire AOC.</p>	<p><u>Current Status on Regulations and Protection</u></p> <p>The only truly protected lands are federal, provincial and conservation authority owned lands, Environmentally Significant Areas (ESAs) and Areas of Natural and Scientific Interest (ANSIs) are areas on public or private lands that have been designated as significant areas; however, in most cases they are not necessarily protected from detrimental land use.</p> <p>Some milestones include: Bickford Oak Woods Conservation Reserve (308 ha); Bear Creek Wetland Complex at 43.3 ha; Pigeon Marsh at 57 ha; Walpole Island Heritage Centre secured 68 ha of the 2,611 ha of prairie, oak savannahs, and Carolinian forest habitats on through acquisitions and leasing arrangements; Wallaceburg Sycamore Woods (4.5 ha) was acquired and protected by the Sydenham Field Naturalists.</p>
<p><u>Actions</u></p> <ul style="list-style-type: none"> • Encourage Lambton County and municipalities and the Municipality of Chatham-Kent to strengthen “Natural Heritage Policies” for the AOC when amending their Official Plans (OPs) to provide greater protection to water quality and fish and wildlife habitat. • As information becomes available, provide Planners with the necessary science and documentation on significant habitats in the AOC to facilitate their efforts to protect natural heritage features. • Ensure that GIS-spatial analysis is shared with county, municipalities, conservation authority, government agencies, First Nations and other groups. • Encourage RAP partners utilize completed reports (e.g., St. Clair River NHS, Binational Habitat Management Plan, MNR Candidate Sites, Wetland Mapping) to guide habitat rehabilitation and protection. • Encourage efforts to protect and/or acquire significant natural spaces. 		<p><u>Responsible Organizations</u></p> <p>EC, OMNR, OMOE, DFO, Municipalities, WIFN, Aamjiwnaang FN, industries</p> <p><u>Anticipated Costs and Timelines</u></p> <p>Communication with municipalities to garner support would be an in-kind activity expected from all participating members.</p>

ST. CLAIR RIVER AOC- HABITAT AND NON POINT SOURCE POLLUTION WORKPLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead
Promote the protection, preservation and rehabilitation of the natural heritage features of the St. Clair River AOC by encouraging Lambton County and municipalities, and the Municipality of Chatham-Kent to incorporate wording in their Official Plans such that the St. Clair River Area of Concern is recognized as a priority area in need of water quality protection and fish/wildlife habitat conservation and protection.	Encourage Lambton County and municipalities and the Municipality of Chatham-Kent to strengthen “Natural Heritage Policies” for the AOC when amending their Official Plans (OPs) to provide greater protection to water quality and fish and wildlife habitat.	*	*	*	*	*	BPAC with CRIC support.
	As information becomes available, provide Planners with the necessary science and documentation on significant habitats in the AOC to facilitate their efforts to protect natural heritage features.	*	*	*	*	*	MNR, CAs, MOE CRIC agencies
	Ensure that GIS-spatial analysis is shared with County, Municipalities, Conservation Authority, government agencies, First Nations and other groups.	*				*	MNR
	Encourage RAP partners utilize completed reports (e.g., St. Clair River NHS, Binational Habitat Management Plan, MNR Candidate Sites, Wetland Mapping) to guide habitat rehabilitation and protection.	*	*	*	*	*	CRIC Agencies and members
	Encourage efforts to protect and/or acquire significant natural spaces.	*	*	*	*	*	CRIC Agencies and members
In addition to the delisting criterion pertaining to Chenal Ecarte wetland creation, broaden the scope of wetland habitat projects to include creation, rehabilitation, acquisition and maintenance within the Walpole Island First Nation delta and headwaters of AOC creeks (as per the Updated Habitat and NPS Rehabilitation Priority Sites).	Make use of the 2006 MNR-GIS database to locate potential wetland habitat project sites.	*					MNR, RLSN, WIFN
	Create an inventory of prioritized wetland project sites by following the “2007 Updated Habitat and NPS Rehabilitation Priority Guidelines”	*					MNR, RLSN, WIFN
	Establish wetland goals and objectives for the AOC and develop numerical and/or qualitative delisting criteria (targets). Track progress on goal achievement.	*					Habitat & NPS Committee
	Identify and engage landowners, seek funding and implement wetland habitat projects to maintain and improve the integrity and hydrologic connectivity of coastal wetlands for fish spawning, nursery and feeding areas and aquatic wildlife needs.	*	*	*	*	*	RLSN, SCRCA, WIFN
	Assess the quality of coastal wetland habitat in the Chenal Ecarte and WIFN delta by collecting data on water quality, aquatic macroinvertebrates, amphibians (if possible), marsh birds, and submerged aquatic vegetation.					*	EC-CWS, WIFN MNR, DFO
	Examine options, risks and benefits of improving fish access to impounded wetlands (i.e., possible impacts on species at risk (SAR, waterfowl production etc.). Work with Walpole Island Heritage Centre regarding aquatic habitat needs to meet fish and wildlife goals and develop a list of project sites in the First Nation delta. Examine ways to control and prevent <i>Phragmites</i> invasion; monitor high-quality and susceptible wetlands, select demonstration areas for control, and plan steps for controlling established <i>Phragmites</i> . Share experiences and transfer knowledge. Prepare wetland quality report with management recommendations once assessments have been completed.	* Chenal Ecarte	* WIFN Chenal Ecarte				

ST. CLAIR RIVER AOC- HABITAT AND NON POINT SOURCE POLLUTION WORKPLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead
Integrate shoreline erosion control approaches and shoreline development (or redevelopment) projects with environmentally friendly habitat approaches (i.e., shoreline softening, buffer strips and spawning channels) that take nearshore aquatic habitats and hydraulic impacts into account.	Develop an Integrated Shoreline Management Plan for the St. Clair River : ■ Use GIS to inventory/map existing shoreline hardening structures on public and private lands and assess condition, habitat features, sediment profile and contaminants, plant, fish and wildlife communities at each site.	70K					SCRCA
	■ Establish quantitative and/or qualitative shoreline rehabilitation targets. Candidate sites include but are not limited to: CN Lands on Sarnia Bay; Guthrie Park; Courtright Waterfront Park; Willow Park; Cathcart Park; Marshy Creek Park; Stag Island, and Walpole Island Delta. Develop engineering plans for candidate sites on public lands which incorporate shoreline softening techniques that replace degraded structures.	*					H & NPS Committee
	■ At sites where softening has occurred, rehabilitate littoral habitat by installing reef structures, submerged rock clusters/shoals, cobble or fish mix and coves to improve the quality of littoral fish habitat. Establish native grasses, shrub and tree plantings at candidate sites behind the shoreline structure.	1.8 M	1.8 M	*	*		SCRCA
	■ Assess the extent of shoreline projects completed elsewhere within the AOC (e.g., SCRCA projects, Chatham-Kent work at MacDonald Park) for reporting purposes.	*					SCRCA
Establish and implement a riparian habitat and buffering program for the St. Clair River AOC (as per the <i>Updated Habitat and NPS Rehabilitation Priority Sites</i>).	Systematically identify public, private and industrial land use and ownership adjacent to tributaries flowing directly into the St. Clair River and prepare a land-use inventory including zoning status (as per the <i>Updated Habitat and NPS Rehabilitation Priority Sites</i>).		*				RLSN
	Undertake a proactive landowner contact program starting in Area 1A to increase the number of landowners involved in tributary buffering within the AOC boundaries.	*	*	*	*	*	RLSN,
	Identify riparian buffer targets for each tributary based on land owner cooperation.	*	*	*	*		RLSN,
	Rehabilitate a minimum of 20 km/year of riparian habitat by establishing vegetative buffer strips, planting appropriate native vegetation, undertaking stream bank stabilization activities, and/or restricting livestock access to riparian areas adjacent to tributaries in Area 1A to a minimum of 3-5 m.	20 km	20	20	20		RLSN, SCRCA
	Track habitat and riparian buffer projects and provide annual reports on the status towards meeting targets. Include information such as: uptake on Environmental Farm Plans; uptake on landowner funding programs; SCRCA and RLSN annual project reports.	*	*	*	*	*	RLSN St. Clair Township
Improve the biological connectivity within the AOC focusing on Area 1A.	Link the WIFN habitats with the McKeough Floodway, headwaters of the St. Clair River tributaries, Bickford Oak Woods and Aamjiwnaang First Nation forest tract through: ■ Planting riparian buffers consisting of rows of native grasses, tallgrass prairie, savannah and native shrubs adjacent to roadside and agricultural drains along Highway 40; ■ Incorporate wetland creation wherever conditions are favourable.	333K, 45 ha	244K, 82 ha	192K, 64 ha	38K, 13 ha	*	RLSN, SCRCA

ST. CLAIR RIVER AOC- HABITAT AND NON POINT SOURCE POLLUTION WORKPLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead
	Establish signs on Hwy 40 to educate the public on the benefit of biological corridors through riparian buffering.			*			RLSN
	Examine other linkages proposed in the Lambton County NHS (e.g. Clay Creek to the North Sydenham River) and investigate and develop actions for additional opportunities on Walpole Island First Nation	*	*	*	*	*	Habitat & NPS Committee
Address and complete all Rural Non-Point Source Pollution and Urban Non-Point Source Pollution “Priority Actions” and track progress impacting on beneficial uses (“as per Updated Habitat and NPS Rehabilitation Priority Sites”.	Continue to provide funding support, technical advice and outreach materials and assist land owners to access funding as part of ongoing NPS and stewardship programs within the AOC (as per <i>“Updated Habitat and NPS Rehabilitation Priority Sites”</i>).	*	*	*	*	*	SCRCA, RLSN, WIFN, Aamjiwnaang
	Develop appropriate Watershed/Subwatershed Management Plans to identify priority NPS sites in the AOC (as per <i>“Updated Habitat and NPS Rehabilitation Priority Sites”</i>). Consult with St. Clair Region CA, examine MDEQ Plan and use existing reports (e.g. Wetlands, riparian buffer, land use, land ownership) and as a foundation for a SCR-AOC subwatershed Management plan.		*				SCRCA, Habitat and NPS committee
	Link urban/rural stormwater control via subwatershed plans		*	*			SCRCA, Habitat and NPS committee
	Identify problems relating to domestic sanitary sources impacting on St. Clair River BUIs and ensure proper maintenance and repair. <ul style="list-style-type: none"> Investigate private septic systems within smaller communities and other homes along the St. Clair River within the AOC to ensure that they are not causing negative effects on water quality of the St. Clair River. Support the implementation to mitigate septic system related problems within smaller communities and other homes along the river within the AOC e.g. Froomfield. Mandate ongoing maintenance of private sewage disposal systems. 	*	*	*	*	County, City building inspection	
	<ul style="list-style-type: none"> Obtain a GIS tile drain layer and identify tile-drain outlet locations. Investigate options to improve water quality at selected pilot sites. Seek expertise and support seasonal restrictive water control devices in fields to mitigate NPS/rural runoff and improve crop yield. 		*				RLSN
	Track NPS projects and provide annual reports on the status to key stakeholders. Use Environmental Farm Plan, SCRCA and RLSN uptake.	*	*	*	*		OMAFRA, SCRCA, RLSN H & NPS Committee

SECTION 4- MONITORING AND RESEARCH WORK PLAN

Introduction

The rehabilitation of beneficial uses is the cornerstone of Annex 2 of the GLWQA. Although the 2005 St. Clair River AOC Update identified significant remedial actions and milestones in the AOC which resulted in reduced loadings of many parameters to air and water, exceedences of yardstick values occur, information gaps exist and significant actions are required.

The Research and Monitoring Subcommittee reviewed each BUI to determine its current status based on existing information and proposed research and monitoring actions. Outstanding actions include obtaining recent results from scientific studies and complete a comprehensive BUI review, and if needed, revision of the delisting criteria.

While numerous government agencies are listed as responsible leads to conduct monitoring and research activities, it is important to understand that these activities are dependent upon available funding, sufficient staff, available time for field studies and coordination among respective agencies and branches within agencies. It is therefore important to maintain and encourage open lines of communication with other potential programs and sources of information (e.g. academic institutions and SLEA). Also important to consider is the use and importance of complementary/ standardized protocols to facilitate data interpretation for various BUIs and general environmental quality.

BENEFICIAL USES DESIGNATED AS “IMPAIRED”

BUI #1 - Restrictions on Fish and Wildlife Consumption

<p><u>1995 Delisting Criteria</u> When contaminant levels in fish or wildlife populations do not exceed current standards, objectives or guidelines, and no public health advisories are in effect for human consumption of fish or wildlife.</p>	<p><u>Current BUI Status</u> Restrictions on Fish Consumption - Impaired Fish consumption guidelines are exceeded for smallmouth bass, rock bass, yellow perch, carp, walleye, freshwater drum, bluegill, white and red horse sucker, gizzard shad (MOE 2005; MUCH 2001). Contaminant levels in sport fish collected from the AOC in 2003 (and before this year) exceeded consumption guidelines for both the sensitive and general populations. Most of the consumption restrictions for the general population in the Huron-Erie Corridor are caused by mercury (32%), polychlorinated biphenyls (PCBs) (51%) and dioxins (including furans, and dioxin-like PCBs) (17%). Based on these fish consumption advisories, the impairment status is “<i>impaired</i>”. Mercury concentrations in walleye exceeded the 0.5 ug/g RAP biota yardstick. A sport fish collection from the Upper, Middle and Lower sections of the St. Clair River was completed in 2006 to determine tissue contaminant concentrations to update the Ontario Guide to Eating Ontario Sport Fish.</p>
<p><u>Restrictions on Wildlife Consumption - Requires further assessment on a Great Lakes Basin basis</u> Health Canada advises that consumption of commonly hunted Ontario waterfowl poses no health hazards. Additional study of the common merganser in the St. Clair River and the hooded merganser in Lake St. Clair is recommended (CWS 1997).</p>	
<p><u>Responsible Organizations</u> MOE, MNR an EC fish contaminants monitoring program.</p>	
<p><u>Existing Monitoring Programs</u> MOE/MNR sport fish contaminants monitoring program. Environment Canada fish contaminants monitoring program.</p>	
<p><u>Research and Monitoring Actions</u></p> <ul style="list-style-type: none"> • Determine the relative role of out of basin sources (i.e., atmospheric contaminants), local on-going sources, and local sources from historical sediment contamination. • Work with MOE and MNR to develop consistent, long-term, corridor-wide collections of sport fish species from the upper, middle and lower St. Clair River to track spatial and temporal contaminant trends. Fish sampling in the upper, middle and lower St. Clair River should be conducted every four years at the very least. (Timeline: ongoing) • Conduct additional monitoring studies to determine the extent to which contaminant exposure and uptake occurs in mergansers, over-wintering waterfowl and other game species to address the BUIs “consumption of wildlife”. (Timeline: CRIC to decide if additional waterfowl contaminant studies are required in 2007). • Review and revised delisting criteria (Timeline: 2007). 	

BUI #2 - Degradation of Benthos

<p>1995 Delisting Criteria When invertebrate community structure can be documented as unimpaired or intermediate as defined by recent OMOEE benthic investigations.</p>	<p>Current BUI Status Dynamics of Benthic Populations/Communities (Impaired) The 1991 Stage 1 reported that data up to 1985 revealed that community structure was impacted beginning at 7km downstream from the Sarnia industrial complex and extending about 12km. The most severely degraded portion occurred at a 1km reach of the river beginning offshore of Dow Chemical. As of 1990, this BUI was “degraded” in several short segments along the Ontario shore for about half the distance identified from the 1990 survey. The “severely degraded” zone was not found in the 1990 survey. The 1997 RAP Update indicated that there was an increasing downstream invertebrate diversity density observed (Harris, 1996), and benthic communities remained moderately to slightly impaired (LIS 1997). Additional studies (Beak int. Inc. 1996) confirm that benthic communities in these zones remain impaired and observed no improvement in these areas since 1985.</p>
<p>Body Burdens of Benthic Organisms (Requires further study on a GL basis) Bioassay and sediment toxicity studies (1994 and 1995 sampling) reported Provincial Sediment Quality Guidelines - lowest and severe effect level exceedences in the “priority 1” zones downstream of the Sarnia industrial area (Pollutech Enviroquatics Limited 1997). Test species mortality, growth, and reproduction were adversely impacted during sediment toxicity testing.</p>	
<p>Responsible Organizations EC (NWRI, WQMS), MOE</p>	
<p>Existing Monitoring Programs The Sarnia-Lambton Environmental Association (SLEA) currently operates an integrated monitoring program that examines sediment conditions in the St. Clair River reflective of historical sediment contamination within the priority sediment zones.</p>	
<p>Research and Monitoring Actions</p> <ul style="list-style-type: none"> • Complete a clear and concise synthesis of existing information to document existing conditions and trends on benthic communities and body burdens. • Identify information gaps in order to review existing delisting criteria, develop management plans and recommend additional remedial options for contaminated sediments (i.e., Integrate findings of the Benthic Assessment of Sediment (<i>Beast</i>) National Water Research Institute, Sarnia Lambton Environmental Association, Great Lakes Institute of Environmental Research (GLIER). • Determine the need to continue the comprehensive (MOE) benthic community assessment for the entire St. Clair River and delta to determine overall benthic community health as was completed in 1957, 1968, 1977, 1985, 1990, 1994 and 1996. (Timeline: CRIC to decide in 2007 if benthic studies are required). • Establish a technical committee to examine existing data and the need for additional studies. (Timeline: 2007) • Review and revise delisting criteria (Timeline: 2007). 	

BUI #3 – Restrictions on Dredging Activities

<p>1995 Delisting Criteria No limitations on disposal of dredging spoils.</p>	<p>Current BUI Status Impaired The Stage 2 document listed a suite of metals and organic pollutants that exceeded the provincial sediment quality guidelines along the St. Clair River, particularly along the Sarnia industrial waterfront and sites downstream. Exceedences of sediment quality guidelines (severe effect levels) were found for the Southeast Bend Cutoff Channel for manganese, mercury, HCB, total PCBs, TKN, and total phosphorus, however, exceedences were less than 5% of samples collected and values were only slightly above sediment quality guidelines (PWGSC 2001). Maintenance dredging in the Southeast Bend Cutoff was most recently completed in 2006, and dredging of the main channel of St. Clair, at Stokes Point Shoal, approximately 2 km north of the village of Sombra, near the Ontario ferry dock was completed in 2005.</p>
<p>Responsible Organizations EC, MOE, DOT</p>	
<p>Existing Monitoring Programs Public Works and Government Services Canada (PWGSC) periodically dredges the southeast bend cutoff and measures contaminant concentrations in dredge spoils. Environment Canada’s National Water Research Institute conducts periodic sediment (suspended and bottom) monitoring throughout the Huron-Erie Corridor including several stations in the St. Clair River.</p>	
<p>Research and Monitoring Actions</p> <ul style="list-style-type: none"> • Collect and synthesize sediment contaminant data for the St. Clair River such as: <ul style="list-style-type: none"> ▪ PWGSC for each dredging event in the St. Clair River AOC; ▪ Consult with GLIER and synthesize results from Drouillard, Hafner and Ciborowski contaminant results for the St. Clair River, St. Clair River Delta, Lake St. Clair and the Detroit River (Huron Erie Corridor); ▪ MOE and EC sediment core results, and ▪ SLEA sediment results (Timeline: 2007). • Review and revise delisting criteria (Timeline: 2007). • Identify the disposal outcome from dredging events based on sediment chemistry analysis and compare with delisting criteria (Timeline: 2007). 	

BUI #4 – Restrictions – Drinking Water Consumption – Taste/Odour Problems

<p><u>1995 Delisting Criteria</u> No treatment plant shuts downs due to exceedences of drinking water guidelines over a two year period.</p> <p><u>Responsible Organizations</u> EC, MOE, SLEA, Municipalities</p>	<p><u>Current BUI Status</u> Impaired The Stage 2 document indicated that periodic closing of water treatment plants occurred due to consumption and taste and odour problems in at drinking water intakes at treatment plants in Ontario as a result of chemical spills.</p> <p>While there were no MOE or MDEQ issued drinking water advisories or mandated water treatment shutdowns for several years prior to 2000, this BUI requires additional assessment given the incidence of spills in 2003-2004.</p>
<p><u>Existing Monitoring Programs</u></p> <ul style="list-style-type: none"> • MOE- Spills Action Centre • Sarnia Lambton Environmental Association continuous chemical monitoring station. • Environment Canada has annually monitored for a wide range of heavy metals and persistent organic pollutants at the head and mouth of the river since 1986. 	
<p><u>Research and Monitoring Actions</u></p> <ul style="list-style-type: none"> • Continue to monitor spills to the St. Clair River. (Timeline: ongoing) • Review and, if necessary, revise the delisting criteria for “restrictions on drinking water consumption or taste and odour problems”. (Timeline: 2007) • Identify the need for improvement to current monitoring programs. (Timeline: 2007) 	

BUI # 5 – Beach Closings

<p><u>1995 Delisting Criteria</u> Zero beach closings based on fecal coliform standards regulating beach closings over a two year period.</p> <p><u>Responsible Organizations</u> Local Health Units, MOE, EC</p>	<p><u>Current BUI Status</u> Impaired Permanent signs warning of possible intermittent pollution of water are posted at four Ontario parks (Willow, Seager, Lambton Cundick and Brander). Postings are to remain until surveying indicates that water quality has improved to a point where bacterial levels are consistently below Ministry of Health guideline (LHU-OMEE 1994, 1995). The City of Sarnia has posted a “No Swimming” sign at Centennial Park on the St. Clair River.</p>
<p><u>Existing Monitoring Programs</u> County of Lambton Community Health Services Department continues to monitor E. coli levels along the St. Clair River and the Chatham-Kent Health Services Department monitors Mitchell’s Bay.</p>	
<p><u>Research and Monitoring Actions</u></p> <ul style="list-style-type: none"> • Obtain water quality monitoring data from the Public Health Unit (bacteria levels in beaches and day-use parks) and MOE – Provincial Water Quality Monitoring Network data for stations within the AOC and St. Clair Watershed. • Obtain routine beach surveillance data from Lambton County and Chatham-Kent Community Health Services Departments (Timeline: ongoing) • Evaluate the source(s) of bacterial contamination of beaches (Timeline: unknown, research needed) • Evaluate the performance of municipality infrastructure upgrades on sewage treatment plants, stormwater treatment, and combined sewer overflows and facility optimization (Timeline: ongoing) • Conduct River wide screening in 2008 and compare with results from 2004. • Work closely with Walpole Island First Nation to determine if there are beach closings at local beaches (Timeline: ongoing) • Assess beneficial use impairment and review delisting criteria (Timeline: 2007) • Support the Lambton County Public Health Unit to conduct a St. Clair River Wide sampling “to determine if the AOC creeks that enter into the river have a significant impact upon the presence and concentrations of Escherichia coli (Timeline: ongoing). 	

BUI # 6 – Degradation of Aesthetics

<p><u>1995 Delisting Criteria</u> When over a two year period there is/are no, objectionable deposits, unnatural colour or turbidity, unnatural odour or unnatural scum/floating materials.</p> <p><u>Responsible Organizations</u> EC, MOE, MNR, Health Unit, Municipalities, WIFN, Aamjiwnaang First Nation</p>	<p><u>Current BUI Status</u> Impaired Stage 2 document identified that floating scums, oil slicks, spills and odours have been periodically reported. CSO overflow events continue in both Port Huron and Sarnia.</p>
<p><u>Existing Monitoring Programs</u> No existing monitoring programs exist for this BUI.</p>	
<p><u>Research and Monitoring Actions</u></p> <ul style="list-style-type: none"> • Develop an appropriate methodology (e.g. questionnaire, contact MOE district office, Health Units, municipalities and the MNR to determine if there have been recent complaints) to evaluate degradation of aesthetics in the St. Clair River AOC. (Cost to produce questionnaires is estimated at \$2,000.00 and a survey of River users is expected in 2007). • Include all partners (U.S., Canadian and First Nations) in the development of study and the decision BUI status. 	

BUI # 7 – Added Costs To Agriculture or Industry

<p><u>1995 Delisting Criteria</u> No plant shutdowns attributable to water quality over a two year period. No added costs for the disposal of contaminated sediment.</p> <p><u>Responsible Organizations</u> EC, MOE</p>	<p><u>Current BUI Status</u> Impaired The Stage 2 document indicated that food processing industries in Ontario have had to temporarily shut down their intakes due to upstream spills. There were no water treatment plant closures or associated interruptions in water supplies to industrial users between 1994 and 1997 (OMOE 1997).</p>
<p><u>Existing Monitoring Programs</u> MOE- Spills Action Centre report on spills that require mandates shutdowns.</p>	
<p><u>Research and Monitoring Actions</u></p> <ul style="list-style-type: none"> • Collect spills data from MOE and review for mandated shutdowns. (Timeline: ongoing) • Review and revise existing delisting criteria (Timeline: 2007) 	

BUI # 8 – Loss of Fish and Wildlife Habitat

<p><u>1995 Delisting Criteria</u> <i>Protection:</i> <u>1. Regulations:</u> Ensure that sufficient enforceable mechanisms are in place to protect existing aquatic and wetland habitat from cultural destruction or degradation, including filling, dredging, adversely affecting the hydrology, cutting or removing vegetation required for habitat, and allowing pollutants such as sediment, excess nutrients or toxic substances to enter aquatic or wetland habitat.</p> <p><u>2. Protection:</u> Protect existing habitat in Ontario.</p> <p><u>Rehabilitation and Enhancement:</u> Of the 5200 ha (12,844 acres) identified as Candidate Sites in Ontario, complete the following habitat rehabilitation projects by the year 2000:</p> <ol style="list-style-type: none"> Chenal Ecarte Wetland Creation (155 ha) (384 acres) Stag Island (80 ha) (198 acres) Darcy McKeough Floodway (445 ha) (1,100 acres) <p>A long term habitat management plan for both Michigan and Ontario, including an assessment of needs (GAP analysis) relating to wildlife diversity and integrity, will be completed to ensure continued habitat rehabilitation and protection beyond RAP delisting.</p>	<p><u>Current BUI Status</u> Impaired The rehabilitation and enhancement delisting criteria have not been completed for the loss of fish and wildlife habitat.</p> <p><u>Existing Monitoring Programs</u> All proponents of habitat rehabilitation projects report on habitat projects and goals achieved to their respective funding agencies on an annual basis.</p> <p><u>Responsible Organizations</u> EC, MNR, WIFN, SCRCA, RLSN</p> <p><u>Timelines and Costs</u> See Section 3.</p>
<p><u>Research and Monitoring Actions</u></p> <ul style="list-style-type: none"> • A St. Clair River shoreline survey for rehabilitation and design of restorative works report. • Pre- and post monitoring of fish abundance and diversity in areas designated for shoreline softening projects to assess the success of aquatic habitat rehabilitation; • Complete a GIS analysis of existing 2006 data to determine tributary lengths, amount of existing riparian habitat, land use and land ownership in order to establish targets. • Benthic monitoring and fish habitat assessments in the tributaries flowing directly into the St. Clair River following major rehabilitation pilot projects in order to measure ecological benefits. • As identified in Recommendation 3.4, work with Walpole Island Heritage Centre to develop a list identifying priority coastal wetland sites on WIFN for CWS wetland habitat quality assessments (i.e., water quality, macroinvertebrate, submerged aquatic vegetation, and marsh birds); and, • Complete wetland assessments and obtain results from WIFN/CWS and WIFN/Bird Studies Canada wetland assessments in order to determine their biological integrity and functionality. • Walpole Island Heritage Centre to identify and develop habitat and community project proposals that will contribute to restoring BUIs for habitat/shoreline remediation i.e., wetland rehabilitation plan 	

BENEFICIAL USES “REQUIRING FURTHER ASSESSMENT”

BUI # 1 - Tainting of Fish and Wildlife Flavour

<p><u>1995 Delisting Criteria</u> When survey results confirm no tainting of fish or wildlife flavour.</p> <p><u>Existing Monitoring Programs</u> There are no consistent monitoring programs to address this BUI.</p> <p><u>Responsible Organizations</u> EC, MNR, MOE</p>	<p><u>Current BUI Status</u> Requires further assessment on a St. Clair River basis.</p> <ul style="list-style-type: none"> • A 1995 controlled subjective olfactory sensory evaluation of tainting in walleye revealed no identifiable tainting by a panel of BPAC members and the public (Myllyoja and Johnson, 1995). • The results of an Angler Survey (1996 – 1997) revealed that, out of 291 respondents that voiced concern over the fish they caught, four percent (N=11) reported fish tainting in previous years (Dawson, 1999). • Not one of the 106 respondents that consumed wildlife raised the issue of chemical contamination of. There was no mention of tainting of wildlife flavour.
<p><u>Research and Monitoring Actions</u></p> <ul style="list-style-type: none"> • Develop an appropriate methodology (e.g. questionnaire, fish tainting panel) to evaluate fish tainting in the St. Clair River AOC (Timeline: 2007; Cost: questionnaire \$2K, fish tainting panel cost unknown) • Include all partners (U.S., Canadian, and First Nations) and use information gathered to assess the status of the BUI based on study results. 	

BUI # 2 - Degraded Fish and Wildlife Populations

<p><u>1995 Delisting Criteria</u> No specific delisting criteria for the St. Clair River are developed for "degradation of fish and wildlife populations".</p> <p><u>Existing Monitoring Programs</u></p> <ul style="list-style-type: none"> • Bird Studies Canada marsh monitoring program • Southern Ontario bald eagle monitoring project • MNR angler creel surveys • MOE and EC fish contaminants program • EC fish and wildlife health effects study • MNR and DFO fish community assessment • 2006-2007 amphibian contaminant and reproductive study. • Canadian Wildlife Service wetland evaluations (wildlife) commenced in 2006 with plans to include the Walpole Island First Nation delta in 2008. <p><u>Responsible Organizations</u> EC, MNR, MOE, WIFN, DFO</p>	<p><u>Current BUI Status</u> Dynamics of Fish Populations - Not Impaired The fish community is considered diverse and FCGOs support the current fish community structure.</p> <p>Body Burdens of Fish - Requires further study on a Great Lakes Basin basis The role of exposure of fish to contaminants originating from outside the St. Clair River relative to local sources is considered essential for a comprehensive evaluation.</p> <p>Dynamics of Wildlife Populations - Requires further study on a site basis No current information is available on wildlife population dynamics.</p> <p>Body Burdens of Wildlife - Requires further study on a Great Lakes Basin basis Wildlife contaminants studies on snapping turtles, Forster's tern and black-tern, and mink have been completed. The Canadian Wildlife Service is currently conducting a 2006-2007 amphibian contaminant study.</p>
<p><u>Research and Monitoring Actions</u></p> <ul style="list-style-type: none"> • Determine the relative role of out of basin sources (i.e., atmospheric contaminants), local on-going sources, and local sources from historical sediment contamination (same action as identified as for BUI Restrictions on Fish and Wildlife Consumption). • Conduct additional monitoring studies to determine the extent to which contaminant exposure and uptake occurs in mergansers, over-wintering waterfowl and other game species to address the BUIs “consumption of wildlife” (same action as identified as for BUI Restrictions on Fish and Wildlife Consumption). • Evaluate aquatic wildlife population dynamics in the AOC including Walpole Island First Nation through wetland evaluations (Timeline: 2007-2009, Cost: \$10K/year). • Work with existing Species at Risk programs (i.e., Canadian Wildlife Service, Department of Fisheries and Oceans, and Walpole Island Heritage Centre) and synthesize information to comprehensively wildlife related BUIs (Timeline: ongoing) 	

BUI # 3 - Fish Tumours and Other Deformities

<p><u>1995 Delisting Criteria</u> No specific delisting criteria have been developed for this BUI for the St. Clair River.</p> <p><u>Existing Monitoring Programs</u> There are no consistent ongoing monitoring programs to examine fish tumours, rather individual studies have been conducted with the most recent collection completed in 2006.</p> <p><u>Responsible Organizations</u> EC, MOE</p>	<p><u>Current BUI Status</u> Requires further assessment on a site specific basis The St. Clair River Stage 1- Environmental Conditions and Problem Definition reported that external tumours or skin lesions (i.e., lymphocystic and dermal sarcoma) on fish (particularly walleye), caused concern among anglers. Research by Johnson et al. (1990) later revealed that tumours may not be linked to anthropogenic factors, but rather by viral skin diseases.</p> <p>A caging study to investigate fish tumours revealed one incident concerning liver tumours and early neoplastic tissue changes in a caged fish held downstream of the Sarnia industrial complex (Pollutech, 1989). The Stage 2 Recommended Plan recognized a growing consensus and sufficient evidence suggesting liver tumours are caused by chemical factors. For this reason additional studies are required on a site specific basis.</p> <p>In 1999, liver samples from 61 fish representing 19 species from different trophic positions (bottom feeders to piscivorous fish) were evaluated to determine the liver tumour by the University of Guelph Pathobiology Laboratory using accepted histopathological criteria (Hayes, 2002). Results revealed no confirmed liver tumours. Environment Canada's National Water Research Institute has been collecting River Redhorse Suckers from the St. Clair River (2001-2006) to evaluate livers for tumours. Results are pending further analysis.</p>
<p><u>Research and Monitoring Actions</u> Await a report on the 2006 fish collection and liver evaluation from EC-NWRI and undertake a comprehensive review on the current status. Integrate previous studies with the 2006 results to determine if this BUI is impaired or not impaired. (A complete liver tumour assessment completed by Environment Canada's National Water Research Institute is anticipated by the end of 2007).</p>	

BUI # 4 - Bird or Animal Deformities or Other Reproductive Problems

<p><u>1995 Delisting Criteria</u> No specific delisting criteria have been developed for this BUI for the St. Clair River.</p> <p><u>Existing Monitoring Programs</u> There are no consistent ongoing monitoring programs to examine bird and animal deformities and reproductive problems, rather individual studies have been conducted with the most recent examining amphibian contaminant and deformity rates occurring in 2006-2007 (WIHC and CWS).</p> <p><u>Responsible Organizations</u> EC</p>	<p><u>Current BUI Status</u> Requires further assessment in the SCR The Stage 1 document provided no evidence of bird and animal deformities. The Stage 2 document recommended further assessment for the St. Clair River AOC based on chironomid mouth-part deformities. Contaminant concentrations in snapping turtle eggs from Walpole Island have been measured on three separate occasions during the 1990s. Results from the 1992, 1995, and 1999 studies indicate that the mean total PCB concentration has not changed markedly over time (Ashpole, 2003; CWS database). Contaminant levels in terns and mink have been measured (1999-2004) and are not suspected of having reproductive impacts (Martin et al, 2004; Weseloh and Jermyrn, unpublished).</p> <p>Assessment of snapping turtle egg hatching success and deformity rates indicated no difference between Walpole Island turtle eggs and eggs from the Algonquin Park. The frequency of hatchling deformity in individuals from Walpole Island was similar to the Algonquin Park reference site (Ashpole, 2004).</p>
<p><u>Research and Monitoring Actions</u></p> <ul style="list-style-type: none"> • Integrate previous studies on birds, reptiles and mammals with the 2006/2007 amphibian results. • Complete a comprehensive assessment of vertebrate classes to determine the status of this BUI (i.e. Impaired, Not- Impaired, Requires Further Study on a Site-Specific Basis). 	

BENEFICIAL USES DESIGNATED AS “NOT IMPAIRED”

BUI # 1 – Eutrophication or Undesirable Algae

<u>1995 Delisting Criteria</u> No specific delisting criteria have been developed for this BUI for the St. Clair River.	<u>Current BUI Status - Not Impaired</u> The 1991 Stage 1 and the 1995 Stage 2 indicate that the waters of the St. Clair river are mesotrophic and algae do not occur at nuisance levels.
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BUI # 2 – Degradation of Phytoplankton and Zooplankton Populations

<u>1995 Delisting Criteria</u> There are no delisting criteria specific to the St. Clair River AOC.	<u>Current BUI Status - Not Impaired</u> The species composition of phytoplankton and zooplankton reflect the oligotrophic to mesotrophic conditions of lower Lake Huron (Stage 1 RAP, 1991). There are no Existing Monitoring Programs for the above BUIs and no long term monitoring is needed for the St. Clair River AOC.
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ST. CLAIR RIVER AOC - RESEARCH AND MONITORING WORKPLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead	Comment	
Restrictions on Fish and Wildlife Consumption	Determine the relative contribution of out of basin sources (e.g., atmospheric contaminants, source water from L. Huron), local on-going sources, and local sources from historical sediment contamination.				*	*	EC/ MOE	Understand migratory habits of both fish and wildlife and likelihood of local exposure. Sources within SCR-AOC must be addressed first. EC-Head and Mouth monitoring current program.	
	Work with MOE and MNR to develop consistent, long-term, corridor-wide collections of sport fish species from the upper, middle and lower St. Clair River to track spatial and temporal contaminant trends. Fish sampling in the Upper, Middle and Lower St. Clair River should be conducted every four years.			*		*	MOE/MNR	Most recent sampling 2006. Next field sampling and contaminant analysis to be conducted in 2009, assessment/reporting 2010.	
	Conduct additional monitoring studies to determine the extent to which contaminant exposure and uptake occurs in mergansers, over-wintering waterfowl and other game species to address the BUIs "consumption of wildlife".			Lit. review Field study	Final report			EC/ WIFN	Recommend a literature review of BSC and EC research result. Consult with WIFN. Possible research by 2008 depending on literature review results (2007).
	Assess BUI, review and revise delisting criteria	*	*					EC/ MOE	Report on 2006 fish sampling.
Degradation of Benthos	Establish a technical committee to examine existing data and the need for additional studies.		*				MOE, EC, SLEA	SLEA conducting triad study in 2007 to complement previous studies. Committee: MOE, SLEA, EC	
	Complete a clear and concise synthesis of existing information to document existing conditions and trends on benthic communities and body burdens. Identify information gaps in order to review existing delisting criteria, (i.e., Integrate findings of the Benthic Assessment of Sediment (Beast) National Water Research Institute, Sarnia Lambton Environmental Association, Great Lakes Institute of Environmental Research).	*					EC, MOE	Currently underway.	
	Technical committee to determine the need to continue the comprehensive (MOE) benthic community assessment for the entire St. Clair River and delta to determine overall benthic community health as was completed in 1957, 1968, 1977, 1985, 1990, 1994.		*					MOE, EC, SLEA	
	Undertake voluntary benthic macro-invert studies.	*	*						SLEA study initiated 2007; completion 2008.

ST. CLAIR RIVER AOC - RESEARCH AND MONITORING WORKPLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead	Comment
	Assess BUI, review and revised delisting criteria		*					
Restrictions on Dredging Activities	Synthesize existing sediment contaminant data for the St. Clair River such as: PWGSC for each dredging event in the St. Clair River AOC; MOE and EC sediment core results, and SLEA sediment results	*					EC, MOE	Consult with GLIER and synthesize results from Drouillard, Hafner and Ciborowski.
	Assess BUI, review and revise delisting criteria.	*					EC, MOE	
Restrictions on drinking water consumption or taste and odour problems	Review and, if necessary, revise the delisting criteria for “restrictions on drinking water consumption or taste and odour problems”.	*	*				MOE, EC	Recommendation to establish a team to examine BUI.
	Evaluate ongoing and potential need for future improvements to monitoring programs.		*				Four Agencies, WIFN	Requires input from all stakeholders
	Continue to monitor spills to the St. Clair River.	*	*	*	*		MOE,	
Beach Closings	Obtain routine beach surveillance data from Lambton County and Chatham-Kent Community Health Services Departments	*					EC, MOE, Health Units	Completed
	Identify and evaluate the source(s) of bacterial contamination of beaches		*	*	*	*	EC, MOE, Health Units	
	Evaluate the performance of municipal infrastructure upgrades on sewage treatment plants, stormwater treatment, and combined sewer overflows and facility optimization	*	*	*	*		MOE, Municipalities	
	Conduct River wide bacterial screening in 2008 and compare with results from 2005.		*				MOE, Health Units	Conduct shoreline sampling at day-use areas.
	Work closely with Walpole Island First Nation to determine if there are beach closings at local beaches		*				EC, WIFN	
	Assess BUI, review and revise delisting criteria.	*					EC, MOE	
	Conduct sampling at SCR creek mouths to determine if the AOC creeks that enter into the river have a significant impact upon the presence and concentrations of Escherichia coli.		*				MOE	
Degradation of Aesthetics	Develop an appropriate methodology (i.e., questionnaire, contact MOE district office, Health Units, municipalities and the MNR to determine if there have been recent complaints) to evaluate degradation of aesthetics in the St. Clair River AOC.	*	*				EC, MOE, BPAC	2007 River wide survey of aesthetics. Contact local offices in 2008.
	Assess BUI, review and revise delisting criteria.	*					EC, MOE	

ST. CLAIR RIVER AOC - RESEARCH AND MONITORING WORKPLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead	Comment
Added Costs to Agriculture or Industry	Through a survey, or other means, examine if industry or agricultural sectors have incurred extra costs due to water treatment methods or due to disposal of contaminated sediments.		*				EC, MOE,	
	Review and revise existing delisting criteria		*				EC, MOE	
Loss of Fish and Wildlife Habitat	Complete pre- and post monitoring of fish use and diversity in areas designated for shoreline softening projects to assess success of aquatic habitat rehabilitation.	*		*			DFO,MNR, EC	Consider expanding this to all habitat projects.
	Complete a GIS analysis of existing 2006 data to determine tributary lengths, amount of existing riparian habitat, land use and land ownership in order to establish targets.		*				MNR, RLSN	
	Continue benthic monitoring and fish habitat assessments in the tributaries flowing directly into the St. Clair River following major rehabilitation pilot projects to measure ecological benefits (1A).	*	*	*	*		SCRCA	
	Consult with Walpole Island Heritage Centre to develop a list of priority coastal wetland sites on WIFN for CWS wetland habitat quality assessments (i.e., water quality, macroinvertebrate, submerged aquatic vegetation and marsh birds).		*				EC, WIFN	
	Complete wetland assessments and obtain results from WIFN/CWS and WIFN/Bird Studies Canada wetland assessments in order to determine wetland biological integrity.	*	*				EC, WIFN	
Tainting of Fish and Wildlife Flavour	Develop a methodology (i.e., questionnaire, fish tainting panel) to evaluate fish tainting in the St. Clair River AOC. Include all partners (U.S., Canadian, First Nations) and use information gathered to assess the status of the BUI based on study results.	\$5K					EC, MOE, First Nations	
Degraded Fish and Wildlife Populations	Determine the relative role of out of basin contaminant sources (i.e., atmospheric contaminants), local on-going sources, and local sources from historical sediment contamination (same action as identified as for BUI Restrictions on Fish and Wildlife Consumption).				*	*	EC/MOE	Understand migratory habits of both fish and wildlife and local exposure. Sources within SCR-AOC must be addressed first. EC-Head and Mouth monitoring program.

ST. CLAIR RIVER AOC - RESEARCH AND MONITORING WORKPLAN

Recommendation	Actions	07	08	09	10	Beyond	Lead	Comment
	Conduct additional monitoring studies to determine the extent to which contaminant exposure and uptake occurs in mergansers, over-wintering waterfowl and other game species to address the BUIs "consumption of wildlife" (same action as identified as for BUI Restrictions on Fish and Wildlife Consumption).		* Field study Lit. review	* Final report			EC/WIFN	Recommend a literature review of BSC and EC research result. Consult with WIFN. Possible research by 2008 depending on literature review results (2007).
	Evaluate aquatic wildlife population dynamics in the AOC including Walpole Island First Nation through wetland evaluations	*	*	*			EC/WIFN	
	Utilize existing Species at Risk program research data to assess BUI status (i.e., Canadian Wildlife Service, Department of Fisheries and Oceans, and Walpole Island Heritage Centre)		*	*	*		EC/ WIFN/ MNR/SCR CA /DFO	
Fish Tumours and Other Deformities	Obtain a report on the 2006 fish collection and liver evaluation from the NWRI and undertake a comprehensive review on the current status. Integrate previous studies with the 2001 results to determine if this BUI is impaired or not impaired.	*	*				NWRI	A complete liver tumour assessment completed the National Water Research Institute is anticipated by the end of 2008.
Bird or Animal Deformities or Other Reproductive Problems	Integrate previous studies on birds, reptiles and mammals with the 2006/2007 amphibian results.	* Field work	*				EC	
	Complete an assessment of vertebrate classes to determine the status of this BUI (i.e. Impaired, Not- Impaired, Requires Further Study on a Site-Specific Basis).	*	* Final report				EC	

SECTION 5 – PUBLIC OUTREACH AND EDUCATION

#5.1 Recommendation

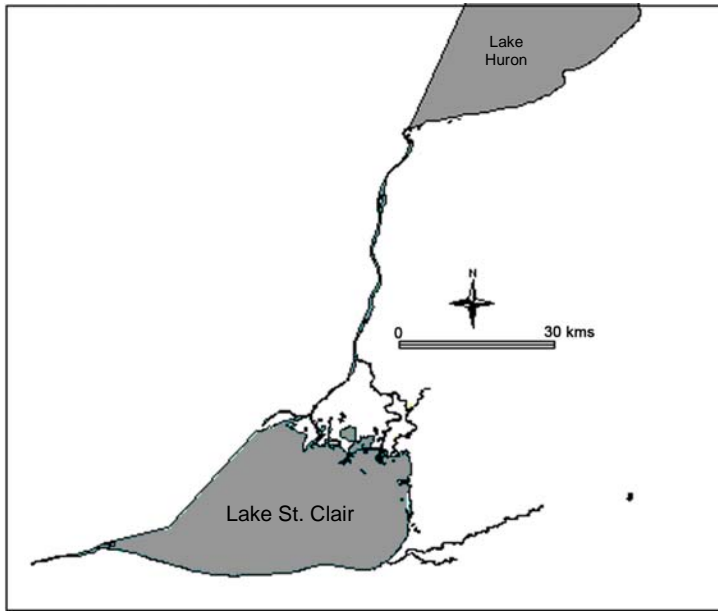
Continue to develop and implement education and communication programs to deal with significant actions for RAP Implementation.

<p><u>BUIs potentially impacted</u></p> <ul style="list-style-type: none"> All BUIs <p><u>Rationale</u> The St. Clair River RAP should have an ongoing strategy to educate the public and promote the objectives and mandate to rehabilitate and delist the AOC. As such, key St. Clair River education and outreach efforts should be ongoing to encourage progress to completing recommended actions. The St. Clair River AOC should use resources to increase attention on its efforts as increased public attention will garner increased public support.</p> <p><u>Responsible Organizations</u> BPAC, SCRCA, EC, MOE, MNR, DFO</p>	<p><u>Current status</u> Numerous public education projects have been initiated over the years, such as: the Friends of St. Clair River website; Waterways of Wildlife (Biodiversity Atlas for the Huron to Erie Corridor); St. Clair Region Conservation Authority educational programs; St. Clair River Binational Public Advisory Council (BPAC) fact sheets, and the BPAC/ Friends of St. Clair River 2006 summer public awareness campaign and photo contest. In addition, the BPAC/FOSCR completed an advertising campaign targeting local media outlets (TV, radio, news) including the development of a media kit (advertisements, news releases, etc) for use by the BPAC and the Canadian RAP Implementation Committee. A Power Point Presentation was completed to engage public groups to educate key stakeholder of the need to complete priority remedial actions.</p>
<p><u>Actions</u></p> <ul style="list-style-type: none"> Support the BPAC in their efforts to enhance local coordination of present and future public outreach projects (e.g. Photo Contest & Promotions; Advertising Campaign; News Releases; Power Point Presentation, Portable Display; Report Card, Fact Sheet). Develop outreach/ education materials to promote the rehabilitation of nearshore aquatic habitat and shoreline softening, such as shoreline tabloid, website, presentation, demonstration day. Recognize the need for and provide funding support for RAP coordination. Continue to provide support to the Friends of the St. Clair River (Canada) for information development and BPAC outreach projects. Develop education materials to Inform the public on correct direct discharges of untreated grey water from boats Celebrate successes and milestones via site visits for public and agency trips to implementation sites. 	

ST. CLAIR RIVER AOC - PUBLIC OUTREACH AND EDUCATION

Recommendation	Actions	07	08	09	10	Beyond	Lead
Continue to develop and implement education and communication programs to deal with significant actions for RAP Implementation.	Support the BPAC in their efforts to enhance local coordination of present and future public outreach projects (e.g. Photo Contest & Promotions, Advertising Campaign, News Releases, Power Point Presentation, Portable Display, Report Card, Fact Sheet).	*	*	*	*	*	EC/ MOE
	Develop outreach/ education materials to promote the rehabilitation of nearshore aquatic habitat and shoreline softening	Fact sheet (5K)	Demonstration Day (3K)			*	SCRCA
	Recognize the need for and provide funding support for RAP coordination.	*	*	*	*	*	MOE/ EC
	Continue to provide support to the Friends of the St. Clair River (Canada) for information development and BPAC outreach projects	*	*	*	*		
	Develop education materials to Inform the public on correct direct discharges of untreated grey water from boats.		*	*	*		DFO, MOE, CCG
	Celebrate successes and milestones via site visits for public and agency trips to implementation sites.	*	*	*	*		CRIC

Appendix 1. **Explanation of the St. Clair River Area of Concern Boundary**



The 1991 Stage 1 “Problem Definition” defined the AOC as the St. Clair River proper. The boundaries extended from the Blue Water Bridge to the southern tip of Seaway Island, west to St. John’s Marsh and east to include the north shore of Mitchell’s Bay on Lake St. Clair. This area encompasses Walpole Island First Nation Territory

In 1995, the Stage 2 - Recommended Plan, expanded the scope of the RAP to encompass the immediate drainage basin (Area 1 in green) of the St. Clair River and include the immediate watershed area including the tributary creeks (Talfourd, Baby, Bowens, Clay, Marshy) in Ontario (see Figure 2.2 of the 1995 Stage 2 –Recommended Plan).

Additional habitat rehabilitation opportunities were identified in the late 1990s (Area 1B). The map to the left illustrates the approximate AOC boundaries.



credits front: Victor Adamko, Fay Akers, Sarah Anderson, Reid Everitt, Ron Kaminski, Keith Lavere, Colleen Lumley, Dave De Shane, Randy Heath, Jean-Yves Hudon, Ray McNiece, Michelle Rondeau.

